

THE UNIVERSITY OF TEXAS AT AUSTIN

Date: 9/12/2016

RECOMMENDATION FOR CHANGE IN ACADEMIC RANK/STATUS

Name: Sun, Nan EID: ns22375 Present Rank: Assistant ProfessorYears of Academic Service *(Include AY 2016-17 in each count)*:At UT Austin since: 1/16/2011 (month/day/year) Total Years at UT Austin: 6.5In Present Rank since: 1/16/2011 (month/day/year) Total Years in Present Rank: 6.5*Tenure-track only:*Number of Years in Probationary Status: 5Additional information: Probationary Extension 2015-16Primary Department: Electrical and Computer EngineeringCollege/School: Engineering, Cockrell School ofJoint Department: N/ACollege/School: N/AOther Department(s): N/ARecommendation actions¹:By Budget Council/Executive Committee: PromoteVote² for promotion 32; Against 0; Abstain 2; Absent 0; Ineligible to vote 1By Department Chair: PromoteBy College/School Advisory Committee: PromoteVote² for promotion 7; Against 0; Abstain 0; Absent 0; Ineligible to vote 0By Dean: PromoteAdministrative Action: Promote to Associate ProfessorDate Action Effective: September 1, 2017

(To be submitted to the Board of Regents as part of the annual budget.)

By: Maurice M. Smith Date: December 15, 2016
For the President¹See "Chart of Recommended Actions" for eligible recommended actions applicable to specific conditions and administrative levels.²Record all votes for and against promotion, abstentions by eligible voting members, and the number of absent eligible voting members. The number of committee members ineligible to vote should also be recorded. Enter zero where it would otherwise be blank.

Dean's Assessment
Nan Sun

Department of Electrical and Computer Engineering
Cockrell School of Engineering

Dr. Nan Sun received his BS in Electronic Engineering from Tsinghua University in 2006. He received his PhD from Harvard University in Engineering Science in 2010. Dr. Sun joined the faculty in the Department of Electrical and Computer Engineering (ECE) at the University of Texas at Austin (UT) in January 2011. If successfully promoted to associate professor in September 2017, he will have accumulated five years of probationary service.

This is not an up-or-out case because the 2015-16 academic year did not count toward Dr. Sun's probationary service. The department decided to put the case forward one year prior to the mandatory review following a budget council vote in early spring.

Twelve external letters were submitted as part of the promotion dossier, of which, six writers were nominated by Dr. Sun, and six were selected by the budget council. Nine letter writers are faculty members at universities in the US: UC Berkeley, UCLA, UC San Diego, Colorado, Columbia, Michigan, Oregon State, Stanford, and Texas A&M. One is a member of the National Academy of Engineering (NAE). Two letter writers are faculty at international universities (IIT Madras and Toronto), and one is from industry (Texas Instruments).

Teaching

Dr. Sun's teaching has been in the area of integrated circuit (IC) design, which addresses the design, simulation, fabrication, and testing of circuits on a single chip. He has taught two undergraduate electives: EE 338K, *Electronic Circuits II* (taught once), and EE 338L, *Analog IC Design* (taught three times). EE 338L is cross-listed as a graduate course, EE 382M-14. Dr. Sun also taught an advanced graduate course on mixed-signal integrated circuit design, EE 382V, *Data Converters* (taught four times).

Dr. Sun's overall average undergraduate instructor rating of 4.63 is considerably higher than the corresponding values for assistant professors in ECE (4.21) and in the Cockrell School (4.17). At the graduate level, Dr. Sun's overall instructor rating is 4.84, which is considerably above the average for assistant professors in ECE (4.43) and in the Cockrell School (4.34). His CIS scores are indicative of his effective teaching style and concern for the students.

Senior faculty conducted peer evaluations of Dr. Sun's lectures five times, and each provided extremely positive assessments of his teaching style.

Research

Dr. Sun has made significant contributions in the field of analog and mixed-signal integrated circuit (IC) design. Specifically, he advanced the sub-areas of low-power analog techniques, time-domain signal processing, advanced analog-to-digital conversion techniques, frequency synthesis, and compressive sensing based analog front-ends. While his research addresses fundamental problems, Dr. Sun is interested in the translation of this work to several signal communication applications and consumer products.

Highlights of Dr. Sun's research include:

- 23 archival journal papers (27 total) and 34 peer-reviewed conference proceedings (37 total) in rank. Fifteen of the journal papers were co-authored with his students.
- His publications have appeared in journals with impact factors (IF) that range from 9.4 (*Proceedings of National Academy of Science*) to 0.93 (*Electronics Letters*).
- Co-author of four book chapters.
- An h-index of 12 (Google Scholar) with 489 career citations.
- Three patent applications pending in rank

Dr. Sun's publication record increased significantly during the second part of his probationary period after the University of Texas signed an agreement with the leading IC foundry, Taiwan Semiconductor Manufacturing Company (TSMC). Dr. Sun needs a foundry to manufacture the integrated circuits that he designs.

While in rank, Dr. Sun has secured \$3.4 million in external funding, of which approximately \$1.7 million is his share. His funding includes three grants from the National Science Foundation (NSF), two of them as PI. One of grants is an NSF CAREER Award on "Combining Nuclear Magnetic Resonance with IC Technology." He also teamed with Dr. Nanshu Lu (Department of Aerospace Engineering and Engineering Mechanics) and a group of researchers at the University of Washington on an NIH grant related to monitoring muscle activity after a neurologic injury.

Dr. Sun has received research grants and gifts from industry, including Samsung, Texas Instruments, Cirrus Logic, and Intel. He has also received in-kind funding in the form of 11 free silicon fabrication shuttles, corresponding to a value of more than \$0.7 million (\$0.5 million his share).

The external references highlighted the innovative aspects of Dr. Sun's work and noted his creativity. Representative comments are summarized below:

Gabor C. Temes¹ (Oregon State, NAE) writes, "I found Dr. Sun's productivity highly impressive. The number of his publications in highly-regarded and selective journals and conferences is very high." And he concludes with this prediction: "Extrapolating from the 5-year record of Prof. Sun, I predict an exceptionally successful future career for him."

Shanthi Pavan² (Indian Institute of Technology Madras, Indian National Academy of Engineering) provides a revealing comment about Dr. Sun's early "work, nicknamed the 'pocket NMR', made waves in the IC design community for its ingenious application of IC technology to an area finding applications in diverse fields, ranging from chemical analysis to biosensing." He adds that "I distinctly remember, while reading Nan's papers on this subject 6 or 7 years ago, saying to myself this author is going to go far." Pavan compares Dr. Sun's research output with others in his worldwide cohort, "I have no hesitation in saying that Nan is among the best of the best. In fact, I cannot think of another assistant professor who has performed so well in a particularly difficult area like data-conversion." Pavan concludes: "In summary, Nan Sun is simply outstanding - I have been following his work for about 7 years now. In a less formal document, I would have said that his case for tenure is a no-brainer."

¹ Professor, School of Electrical Engineering and Computer Science

² Professor, Department of Electrical Engineering

David J. Allstot³ (UC Berkeley) writes: “He impressed me with his world-class blend of creativity, analytical capabilities, experimental acumen, and breadth. His NMR work, for example, has combined deep aspects of physics, molecular engineering, signal processing, and analog/mixed-signal IC design.” Concerning his research productivity and the quality of his work, Allstot notes: “The quantity of Prof. Sun’s production is impressive. Many of us evaluate productivity informally based on an expectation of two archival journal papers and four conference papers per year measured over a number of years determined by the Ph.D. graduation year. Prof. Sun received his Ph.D. in 2010 so with 26 archival journal papers and 36 conference papers, he easily exceeds this difficult metric.” Allstot concludes by offering the “strongest possible support for promotion to Associate Professor with indefinite tenure.”

Boris Murmann⁴ (Stanford) praises Dr. Sun’s work on digitally assisted analog circuits by stating that it... “contains unique and new ideas that have brought these algorithms from an academic curiosity to a state that is now much more applicable to actual products.” He goes on to state, “Dr. Sun’s group has published a number of creative ideas.”

The letters written by Ian Galton⁵ (UC San Diego) and Edgar Sanchez-Sinencio⁶ (Texas A&M) were generally positive and recommended promotion, but raised a few concerns.

- Galton questioned why Dr. Sun chose to publish several papers in rank in the lower impact factor journals *IEEE Transactions on Circuits and Systems II: Express Briefs* (IF=1.1) and *IEEE Electronics Letters* (IF=0.93), rather than in the *IEEE Journal of Solid-State Circuits* (JSSC) (IF=3.3) or the *IEEE Transactions on Circuits and Systems I: Regular Papers* (IF=2.4).
- Sanchez-Sinencio recommended that Dr. Sun “increase the number of publications in top journals.”
- Galton also advised “Professor Sun to write such papers (in high-impact journals) in a more balanced, analytical fashion. Many of his papers contain good ideas, but they sometimes contain sweeping statements, often without proof, about the benefits of his ideas and the drawbacks of previously published techniques.”

Advising and Student Mentoring

Dr. Sun has graduated four PhD (one co-supervised) and 14 MS students, and one former student is currently an assistant professor at the University of Buffalo. Dr. Sun is currently supervising 11 PhD students (two co-supervised) and two MS students.

University Service

Dr. Sun has served on the Parking and Traffic Appeals Committee at the university level and on five departmental committees, including the future of ECE curriculum reform committee, the ECE integrated circuits and systems area graduate admissions committee, and two faculty search committees. In addition, he has been the organizer for the ECE integrated circuits and systems seminar series since 2011.

³ Professor in Residence, Department of Electrical Engineering and Computer Science (formerly Department Chair, Department of Electrical Engineering, University of Washington)

⁴ Professor, Department of Electrical Engineering

⁵ Professor, Department of Electrical and Computer Engineering

⁶ Endowed Chair, Department of Electrical and Computer Engineering

Professional Service

Dr. Sun has been active in several professional organizations and has served on various organizing committees. He is an associate editor for the *IEEE Transactions on Circuits and Systems I: Regular Papers* and a member of the editorial board for the *Journal of Semiconductors*. He has served as a member of the technical program committee for the Custom Integrated Circuits Conference, continuously since 2012 and for the Asian Solid-State Circuits Conference during the same period. Dr. Sun serves as the vice chair of the Central Texas Joint Chapter of the IEEE Solid-State-Circuits Society and the Circuits-and-Systems Society.

Other Evidence of Merit or Recognition

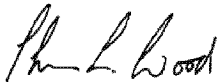
Dr. Sun received a CAREER Award from the National Science Foundation in 2013. In addition, his work has been featured in the scientific and popular press, including the *EE Times*, *R&D Magazine*, *Electronics Weekly*, and the *MIT Technology Review*.

Overall Assessment

Dr. Sun has established a strong research program in a mature field, and he is moving into the highly promising field of analog sensor design. His work has shown wide applicability in various application spaces, and he has developed deep relationships with industry, as evidenced by the recurring financial support provided by several companies for his research endeavors. Reference letters are overwhelmingly positive. While a few reviewers made suggestions to improve the impact of his publications, all recommended promotion. Dr. Sun has proven to be an excellent teacher and mentor. His record of service is solid.

The Cockrell School Promotion and Tenure Committee discussed the concerns expressed in the letters at length. In the end, they agreed with the department chair's and budget council's assessments and unanimously supported promotion.

Overall, I believe that Dr. Sun's performance meets or exceeds expectations for promotion to associate professor with tenure in all categories, and I support this case without reservation.



Sharon L. Wood, Dean
18 October 2016

Master Promotion Summary Table
Nan Sun

Metric	Value
Peer-reviewed journal publications (in rank <i>and total</i>)	23 / 27
Peer-reviewed conference proceedings (in rank <i>and total</i>)	34 / 37
Number of <i>journal</i> papers <i>in rank</i> with UT students <i>as co-authors</i>	15
Total citations of all publications (career) <i>from ISI Web of Knowledge</i>	228
h-index (career) <i>from ISI Web of Knowledge</i> *	7
Total citations of all publications (career) <i>from Google Scholar or Publish or Perish</i>	489
h-index (career) <i>from Google Scholar or Publish or Perish</i> *	12
Total external research funding raised	\$3.4M
Total external research funding raised (candidate's share)	\$1.7M
Total number of external grants/contracts <i>awarded</i>	18
Number of external grants/contracts <i>awarded</i> as PI	16
PhD students completed†	3.5 (3 sole advisor)
MS students completed†	14 (14 sole advisor)
PhD students in pipeline (as of 09/2016) †	10 (9 sole advisor)
MS students in pipeline (as of 09/2016) †	2 (2 sole advisor)
Number of courses taught	8
Total # of students taught in organized courses	256
Average instructor evaluation for UG courses	4.55
Average instructor evaluation for Grad courses	4.83
Average course evaluation for UG courses	4.30
Average course evaluation for Grad courses	4.65
Teaching awards	0
Student organizations advised	0
Undergraduate <i>researchers</i> supervised	6
Service on journal editorial boards	2
Number of symposia organized	5

**Provide a printout/screen shot of the first page of the report from both ISI Web of Knowledge and Google Scholar*

† Count a student as 1.0 if sole supervisor and 0.5 if co-supervised.

Nan Sun
 Department of Electrical and Computer Engineering
Course Rating Averages

What source was used to complete this chart? My CIS

EE 338K: Electronic Circuit II

Semester	Class Size	Number of Responses	Instructor Rating	Course Rating
Spring 11	41	24	4.8	4.5
Mean	41	24	4.8	4.5

EE 338L: Analog IC Design

Semester	Class Size	Number of Responses	Instructor Rating	Course Rating
Fall 12	57	37	4.5	4.3
Fall 14	58	39	4.6	4.4
Fall 15	58	33	4.3	4.0
Mean	58	36	4.5	4.2

EE 382V: Data Converters

Semester	Class Size	Number of Responses	Instructor Rating	Course Rating
Spring 12	20	19	5	4.9
Spring 13	15	14	4.9	4.8
Spring 14	11	10	4.6	4.6
Spring 15	10	10	4.8	4.3
Mean	14	13	4.8	4.7

Table 1. Research Summary

Metric	Value
Peer-reviewed journal publications (in rank <i>and total</i>)	22 / 26
Peer-reviewed conference proceedings (in rank <i>and total</i>)	34 / 37
Number of <i>journal</i> papers <i>in rank</i> with UT students <i>as co-authors</i>	14
Total citations of all publications (career) <i>from ISI Web of Knowledge</i>	228
h-index (career) <i>from ISI Web of Knowledge*</i>	7
Total citations of all publications (career) <i>from Google Scholar</i>	489
h-index (career) <i>from Google Scholar</i>	12
Total external research funding raised	\$3.4M
Total external research funding raised (candidate's share)	\$1.7M
Total number of external grants/contracts <i>awarded</i>	18
Number of external grants/contracts <i>awarded</i> as PI	16

Table 2. External Grants and Contracts Awarded (Total ≈ \$3.4M; My Share ≈ \$1.7M)

Role of Candidate and Co-Investigators	Title	Agency	Project Total	My Share	Grant Period
PI: Nan Sun David Pan (co-PI)	SHF: Small: Design/Automation for Synthesizable and Scaling Friendly Analog/Mixed-Signal Circuits	NSF	\$450K	\$225K	2015-2018
PI: Nanshu Lu (Aerospace); co-PI: Nan Sun	Stretchable Planar Antenna Modulated by Integrated Circuit for the Near Field Communication of Epidermal Electrophysiological Sensors	NSF	\$380K	\$190K	2015-2018
Sub-award PI: Nanshu Lu (Aerospace); Sub-award co-PI: Nan Sun; PI: Katherine Steele (University of Washington)	Ubiquitous rehabilitation to monitor and improve muscle activity and movement after neurologic injury	NIH	\$1.5M total, \$370K sub-award total	\$185K	2015-2019
PI: Nan Sun	CAREER: Combining nuclear magnetic resonance with IC technology	NSF	\$400K	\$400K	2013-2018
PI: Nan Sun	High temperature LNA design	COSL	\$75K	\$75K	2015
PI: Nan Sun	Low-power high-speed ADC for CMOS image sensor	Samsung	\$100K	\$100K	2015
PI: Nan Sun	Multichannel MRI transceiver design	Samsung	\$100K	\$100K	2014
PI: Nan Sun	Miniature NMR systems for rock and outcrop analysis	Formation Evaluation Industry Consortium	\$105K	\$105K	2011-2014
PI: Nan Sun	Gift for student design	Texas	\$20K	\$20K	2011-

	contest	Instruments			2015
PI: Nan Sun	Gift	Texas Instruments	\$60K	\$60K	2015
PI: Nan Sun	Gift	Texas Instruments	\$60K	\$60K	2014
PI: Nan Sun	Gift	Texas Instruments	\$60K	\$60K	2013
PI: Nan Sun	Gift	Cirrus Logic	\$20K	\$20K	2016
PI: Nan Sun	Gift	Cirrus Logic	\$20K	\$20K	2014
PI: Nan Sun	Gift	Cirrus Logic	\$20K	\$20K	2013
PI: Nan Sun	Gift	Cirrus Logic	\$20K	\$20K	2012
PI: Nan Sun	Gift	Intel	\$18K	\$18K	2012
PI: Nan Sun	Gift	Intel	\$30K	\$30K	2011
TOTAL			\$3.4M	\$1.7M	

Table 3. External In-Kind Donations (Total Market Value \approx \$0.7M; My Share \approx 0.5M)

	Free Integrated Circuit (IC) Fabrication	Company	Donation in Value	Candidate's Share	Year
Lead PI	4 mm ² free IC fabrication in 130nm	MOSIS	\$20K	\$10K	2016
Lead PI	Twice 9 mm ² free IC fabrication in 40nm	TSMC	\$180K	\$180K	2016
Lead PI	Twice 25 mm ² free IC fabrication in 180nm	TSMC	\$60K	\$60K	2016
Lead PI	16 mm ² free IC fabrication in 130nm	MOSIS	\$75K	\$37.5K	2015
Lead PI	Twice 9 mm ² free IC fabrication in 40nm	TSMC	\$90K	\$90K	2015
Lead PI	25 mm ² free IC fabrication in 180nm	TSMC	\$30K	\$30K	2015
Lead PI	16 mm ² free IC fabrication in 130nm	MOSIS	\$75K	\$37.5K	2015
Single PI	1 mm ² free IC fabrication in 65nm	Texas Instruments	\$10K	\$10K	2014
Single PI	1 mm ² free IC fabrication in 65nm	Samsung	\$10K	\$10K	2014
Lead PI	16 mm ² free IC fabrication in 130nm	MOSIS	\$75K	\$37.5K	2014
Lead PI	16 mm ² free IC fabrication in 130nm	MOSIS	\$75K	\$37.5K	2013
Lead PI	16 mm ² free IC fabrication in 130nm	MOSIS	\$75K	\$37.5K	2012
Total			\$0.7M	\$0.5M	

Division of Labor – Research Projects

Nan Sun
 Electrical and Computer Engineering
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The division of labor for research projects/grants while in rank is provided in the table below. Only collaborative projects are listed (3 of 18). The full list of awarded grants is available in my CV and research statement.

Co-Investigators	Division of Labor	Title	Agency	Project Total	Candidate Share
PI: Nan Sun David Pan (Co-PI) ECE	NS 50% effort, DP 50% effort	SHF: Small: Design/Automation for Synthesizable and Scaling Friendly Analog/Mixed-Signal Circuits	NSF	\$450K	\$225K
Co-PI: Nan Sun Nanshu Lu (PI) Aerospace	NS 50% effort, NL 50% effort	Stretchable Planar Antenna Modulated by Integrated Circuit (SPAMIC) for the Near Field Communication (NFC) of Epidermal Electrophysiological Sensors (EEPS)	NSF	\$380K	\$190K
Co-PI: Nan Sun Nanshu Lu (PI) Aerospace	NS 50% effort, NL 50% effort	Ubiquitous rehabilitation to monitor and improve muscle activity and movement after neurologic injury	NIH	\$370K (sub-award total)	\$185K